THE COMPUTER BULLETIN

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The Editors welcome items of interest to members from manufacturers, users and others, and particularly news of forthcoming conferences, courses and lectures.

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The Society is open to all those with an interest in computational machinery and techniques allied thereto. Details of membership can be obtained from the Secretary at the London offices or from any of the Honorary Branch Secretaries.

WHERE ANGLES FEAR TO TREAD

At the present time there are more than one thousand large and medium computers (excluding electronic calculators) installed in the United States and claimed to be operating, the great majority for use in business applications. According to the mid-1957 survey by the American magazine *Fortune*, a further 1,500 are on order. It is often hinted that many of these 2,500 installations were ordered before detailed appraisal of the job to be done was completed.

How does the United Kingdom stand? According to *Office Management*, the number of digital computers delivered in the first nine months of 1957 was more than double the total installed at the end of 1956, with a significant rise in the number of machines for business use on the customer's own premises. But the numbers of the latter are very small indeed: only one at the end of 1956, about fifteen by the end of October 1957, with thirty more then on order. The total score at that date, for all purposes, but excluding machines for export, was 83 installed and 89 on order. Only about 20% of those installed were for business use, compared with about 40% of those on order.

It seems likely that the number of computers installed for EDP will, within a year or so, exceed the number of mathematical and scientific machines, but on the figures quoted we would seem to be lagging far behind the United States.

This is partly because in the United States there has been a sense of urgency to install computers; there is prestige value in the possession of a machine. One must give them credit for undertaking the painful task of learning by experience.

In this country there has been a more cautious approach; the potential user generally demands an economic installation which is an advance on present procedures or which gives him some process he could not have before. He does not want just another office machine to do something that is now being done fairly efficiently by other means. He fears the wide reorganization of his business that may be needed if he were to absorb a computer into it. He prefers a slow and steady advance, with careful reconnaissance before each step forward.

It is of interest, however, that the *Economist*, commenting on a new computing centre with facilities for short courses for company executives, suggests that the need for these arises because "some British companies are buying these machines without a clear idea of their potentialities."

We hope this is not the case. We believe that in this country most companies are giving a great deal of thought to the problems of application before buying machines, and spending many months investigating their potentialities. Let us maintain this standard, so that computer installation never becomes a race between managements. For, as Sir George Thomson said at the inauguration of FERDINAND at Durham University, "of all the inventions of our age none has a wider range of possibilities than this."

February Fashions

From Valentine's Day to Mother's Day, the intervening weeks are traditionally given to launching contemporary feminine fashion. The sack gives way to the trapeze, hems approach the knees, husbands take a tighter grip on their overdrafts.

We, too, have a new look. *The Computer Bulletin* has exchanged typescript for Times, restyled its layout, expanded its budget. The effect, we hope, is contemporary, but, like the computer, asexual.

With many difficulties behind us, our first aim is to catch up on our delayed publication schedule by appearing at approximately monthly intervals, so that we shall start the Society's second year with an established and informative periodical of value to our members and subscribers, and befitting to the Society's standing.

Change of Address

From Friday 7 March the offices of the Society will be at Finsbury Court, Finsbury Pavement, London, E.C.2. The accommodation at Bury Street, St. James's, was provided by the National Research Development Corporation as a temporary measure during the formative period, and the Society is deeply indebted to the Corporation for this generous help.

Bouquet of the Month

"Commencing in April The British Computer Society Ltd. will publish a quarterly Journal entitled *The Computer Journal*. This will be complimentary to *The Computer Bulletin*. . . ." *British Communications and Electronics*.

COMPUTER COMMENT

Getting Ideas

"The machines are getting above themselves," complains Tangent in *Nuclear Engineering* (*January 1958*). "Not content with their legitimate work, the solution of mathematical problems, they are branching out into sidelines. They are composing melodies, writing love-letters, and supplying such urgent and essential information as an analysis of the Versailles peace treaty and the determination of the order of composition of Plato's dialogues."

Computer people will probably have remained unmoved by Tangent's plaintive protest; after all, these are just the things they have been trying to make computers do for years. Even fabricated love-letters can be of practical value to those young programmers whose personal affairs have suffered from too many evenings spent at the control desk. Opinions will be divided, however, on another matter to which Tangent draws attention—the fact that a computer has succeeded in evaluating pi to 3,000 decimal places over a week-end. This, he says, "will be highly gratifying to anyone who requires this order of accuracy." Of course no one does. Was this exercise therefore a waste of time?

One thing which this week-end vigil did accomplish was to impress upon Tangent the capabilities of computers. Unfortunately it seems inevitable that the only achievements of computers that make any impression on the general public are the quite useless stunts that get programmed for fun. Perhaps, therefore, Tangent may be forgiven for detecting a sinister trend in computer behaviour.

He draws comfort from the fact that "no computer has yet written a love-letter to another computer," and suggested that, instead of spending the week-end evaluating pi they should "elope together and have a dear little cash register."

T.V. Topic

The B.B.C.'s "Eye on Research" on 28 January brought Professor F. C. Williams and the Manchester University computers to the fireside. Avoiding jargon, Professor Williams demonstrated the machine in simple terms and gave examples of their use. While the *Manchester Guardian* stressed his treatment of them as "essentially simple-minded devices" (and devoted most of its report to a critique of Mr. Robert Reid as the interviewer in the part of "the ignorant man"), the *Newcastle Evening Chronicle* doubted "whether the programme enlightened anybody." We would only comment that at least we saw computers actually doing a job, in vivid contrast to most so-called demonstrations.

All Mod. Con.

Tenants are being attracted to a new industrial estate at Westbury, Long Island, New York, by the announcement that an electronic computing service will be provided on the estate.

The computing centre has been set up by REMINGTON RAND and will be equipped with a UNIVAC 120. This is an electronic punched-card calculator with 120 decimal digits of internal storage, programmed by plugboard.

Russian Computer Installations

Recent reports from Russia are summarized in an article in *The Accountant* (*11 January, 1958, p.* 28). Mechanized accounting is centred in "machine-calculating stations" under the control of the Central Bureau of Statistics. These are equipped with punched card machines, many of which are outmoded and not in full use. The calculating-machine industry is now undergoing expansion to meet the needs of these stations.

However, although some excellent electronic computers have been built for scientific work, the first electronic computer for accountancy purposes is not expected to appear until 1960. It seems that the crusade of the scientists against the traditional ideas of accountancy is being fought in Russia also, though rather more slowly than in the West. It is now taking the well-known form of Press criticisms directed against government departments; some of these criticisms are quoted in the article in *The Accountant*, and have a familiar ring here also.

Hot Work

A computer originally designed and constructed at Harwell for mathematical calculations was bought by the Oxford Mathematical Institute and offered to the technical college putting up the best reason for wanting it.

Wolverhampton and Staffordshire Technical College, the winners of this novel contest, now use it for practical research work on temperature statistics. By analysing daily temperatures in the area for the past fifty years, West Midlands Gas Board will have daily temperature forecasts for guidance in production control.

Yes + No = ?

It is reported from America that during a study of coding written matter for later automatic abstractions by computer, one scientist analysed the Treaty of Versailles. Factual summarization by the computer disclosed that for each positive statement there was an exact negative, so that the net effect of the document was, theoretically, zero. Doubtless we shall eventually achieve pre-simulation of world affairs in "summit" conferences between computers.

Wrong Root

Twenty-seven-year-old woman calculator, Sakuntala Devi, was demonstrating her thought processes in Singapore recently, matched against an electronic computer. Asked the fourth root of 7,957,328,561, they gave different answers. The computer was wrong.

£75 *Computers*

Several schools are designing and building simple electromechanical digital computers, usually as extra-curricular activity in club work. St. Albans, Belfast, have constructed a machine based on telephone relays; other components have been given by parents, to a total value of £75.

COMPUTERS AND DATA PROCESSING

Dudley W. Hooper, M.A., A.C.A.

From an address given at a meeting of the Newcastle and District Branch of the Society on 23 January 1958.

It is surprising how many otherwise responsible executives of industrial concerns are carried away by such terms as "office automation," "electronic office" and similar phrases on which they pin their hopes of a future in which they have but to press the button and they will be relieved of responsibility for the answer. Some people are still living in this dream world, conjuring up in their imagination some machine which can relieve the executive of all need for decision, remove the drudgery of office work entirely, and carry out any data processing exercise that may be hatched up in the minds of management without, apparently, any regard for the limitations of a computer.

That is not to say that a computer should only be regarded, when applied to data processing, as another office machine. It is something more than just an overgrown version of a calculating machine, and in practical application certainly ranges far beyond the concept of one job at a time.

This "single job" approach is, admittedly, probably the right way to go about the actual installation once an overall scheme has been planned and the machine arrives, but it is doubtful whether, in normal commercial data processing, an installation will be economical if it is restricted to the replacement of "orthodox" current equipment doing the same job.

It should be realized that a computer is capable of acting as the heart of a completely integrated data processing system whereby, with one reading of basic information, the data can be handled and manipulated so as to produce every management requirement from that data.

But we must never forget the essential limitation of the machine: that it cannot create a thought, that it can never make a snap estimate or follow a hunch, but can only do precisely what it has been instructed to do.

* * *

A computer, then, in any data processing application, is limited to exercising clerical judgment. It can do anything that a clerk can do, or anything that a clerk can be trained to do if given a set of rules to follow. Provided that these rules can be translated into arithmetical form then a computer can do his job. It will do this almost in the same way, if the working of the clerk is analysed down to step-by-step logical procedure, although in practice a human being may take short cuts from memory. Such short cuts could equally well be done by a computer, but it would require additional storage space and searching time to draw on this stored experience, and it is more usual for the computer to do the operation in full every time it meets the particular problem.

That is not to say that a computer can only follow the mental processes of one clerk at one time; it is when, within a computer program, one combines the functions of a number of clerks each doing different processes on the same basic data that the full benefit of a computer in a data processing application can be gained.

Accepting then that a computer has wide application in clerical data processing systems, and that it has a use in an office, let us consider for a moment what we mean by an "office"; let us take as an example a typical manufacturing concern. It does not matter for the purpose of illustration what the concern may be making, but let us assume that the products cover a fairly wide range, that the firm does its own distribution and selling, and that consequently it has a number of functional departments looking after the different aspects of the business, although a number of these functions may be carried out in quite a modest way by quite a small department.

The "office" in this type of concern, which is fairly common throughout the country, usually means to the factory management the rooms upstairs or at the front where various clerical operations go on, many of which are a sheer waste of time and exist only for the sake of the weekly board meeting and the annual shareholders' meeting. In this office you will often find that the organizational pattern has grown over the years so that it has tended to multiply into little separate functional cells. The secretary will be dealing with the records of

shareholders and other matters relating to the affairs of the company, the accountant will be dealing with the financial accounts, while there may be a cost accountant dealing with an entirely separate set of accounts which purport to show the true cost of sales of products. Neither of these gentlemen, of course, handle cash at all, and a cashier has his own department which calculates wages (from information provided by somebody else) and deals with the collection of cash from debtors and the payment of cash to creditors. These two departments, debtors and creditors, often have their own separate organization looking after the ledgers. There may be a separate invoicing department. Someone else has the function of purchasing raw materials, for which he will rely on a stores accounting section of the office; another section analyses and evaluates materials consumed and in stock, although it is more than likely that if we go into the stores in the factory we will find another set of stores accounts because neither storekeeper nor office really trusts the other to have the right answer.

This tendency for the factory not to trust the office, and vice versa, is again exemplified by the factory manager often having his own works accountant, with necessary staff, to produce "on the spot" costs that the cost accountant in the front office can only produce, neatly ruled up, several days, or even weeks, after the event. Then, additionally, one finds other people recording machine performance and carrying out work and time studies, with supporting clerical staffs manipulating the figures to give some information to someone.

And so it goes on, right through the organization. The selling side often shows a similar duplication of effort. All these little separate cells of work are not large departments; the general staffing of the office is not by any means over-generous. This sort of thing occurs in a normal concern with a normal ratio of clerical to production personnel.

The two main things wrong are, firstly, that there is a great deal of duplicate processing of the same initial data and, secondly, that each level and function of management is determining its own requirement of information without regard to that which may be being prepared for another department.

* * *

Let us now assume that the Directors, and clearly this will usually be decided at Board level, agree to install a computer. They have heard what wonderful machines they are, they have visited a number of computer manufacturers, they have heard what other firms are proposing to do. They have to make a gesture, if only to themselves, to uphold the prestige of their organization. Meanwhile, of course, several heads of departments in the office have each been working out how he could use a computer in his particular section to do some job which involves a considerable use of clerical labour; it is easier to justify a computer for an existing job than to work out the job afresh and its interrelation with others. So the machine is ordered for one particular job. And manufacturers must take their share of the blame.

I do not think I need to emphasize to this audience the importance of first analysing the problem, determining the requirements of management, and seeing to what extent the same initial data can be used for a number of management purposes. Analysis of the basic information collected and all the uses to which it is at present put, with analysis of the processes by which the raw data reaches the end product, will take time but is a comparatively straightforward exercise. The second task, that of determining what information management really requires, for what purpose, and how frequently, is far more difficult and can take very much more time, particularly as it is often necessary to educate management before they know what they want! But I submit that both these jobs must be done *before* one starts worrying about the sort of machine one needs for the interim process between the collection of basic information and the final report to management.

One thing that will undoubtedly emerge from such an examination of the prerequisites of any data processing system will be the shift of emphasis from the "Treasury" function of an office to the management accounting function. In many instances the limitations of present methods of processing data, with the financial fixed-period requirements of paying employees or creditors, or billing debtors, have meant that much management information has only been ascertained by analysis of the post-treasury function. For example, invoicing customers has come before analysing sales; calculating labour costs has come after ascertaining net pay and completing payroll. But when we appreciate the speed of data processing by a computer—subject to the limitations discussed above, and subject also to the limitations on the speed of translating raw information into a medium the computer can understand—we have a means of designing a data processing system primarily to produce information for management, and secondarily (because we happen then to have the information available) for performing the normal cash accounting functions of an office.

Once this shift in emphasis is appreciated, it becomes much easier to see how integration of a process can operate. Still taking the example of this imaginary manufacturing concern, it may well be that until now the firm has always found it necessary to keep fairly large dispersed stocks of its products, representing locked-up capital, to be able to give reasonably fast delivery when orders are received. A normal process would be for the order to be checked first to see whether the goods are in stock, for the necessary documentation (invoice, advice note, etc.) to be prepared, and for this documentation also to serve the purpose of providing a despatch order.

The goods are despatched from stock, the means of despatch and loading data being ascertained only by analysis of the despatch orders after they have been prepared. The invoice is sent to the customer at the same time as the goods are despatched and the copy invoices retained in the office are then used for analysing sales by type of buyer, by salesman's territory, by type of commodity, and so on, for the information of the sales department.

When all the despatches have been made, the stock on hand is reviewed against sales over a past period and a works order made out for those goods to be replaced by manufacture. And so the process goes on, each department going into action only as the result of some action by another department so that each tails along behind the other. The end of the chain, the purchase of raw material to replace that used in replenishing stocks of finished goods, may come several months after the placing of the original order by the customer.

But the trigger event, the catalyst that starts this chain reaction, is the placing of this order. It is this information which should be fed straight into a computer, already supplied with the standing data of what is available, what action should be taken if it is not available, and so on, so that the data processing system will produce, from the basic information fed into it, the complete instructions for every department to operate simultaneously in taking whatever action may be needed in respect of each particular order. At the same time, information for sales and production managements, for storekeepers and others, can be produced before the goods have been physically despatched. After that, from the same information but as a separate operation, the necessary individual documents for each customer can be printed off and the cash aspect dealt with.

* * *

This integrated operation on the disposal of the firm's products is, however, but one of the four main aspects of activity. The other three are labour, materials, and the process of manufacture.

As indicated earlier, emphasis in many concerns has been primarily on calculating net payroll and only afterwards doing the necessary analyses of labour costs and producing other information for management. But if we feed into a computer the essential basic information that an identified individual did a certain job in a certain time on a certain day at a certain rate, and if the installation already holds in some convenient storage the standing data relating to that named individual (such as his occupation, grade, rate, special allowances or deductions, tax details and any other historical data necessary), then as a first operation we can provide management with all costing data, the performance of the individual or group of individuals, the deployment of labour, and other information necessary to achieve maximum efficiency from the minimum labour force. Since all the data relating to the work performed by each individual is now in the machine, we can then go on to produce the payroll and other information relating to each individual, with such updated historical data as may be required.

Similarly with materials; knowledge that certain materials have been used in certain operations, and related to particular output, is the basic data that should be fed into the machine. If we already hold in store the stock position, the expected consumption in relation to possible output, a materials price list and other necessary data, we can first provide management with essential costing data relating to material consumption in relation to the product, and further go on to control materials issues and stocks, advise the purchasing officer of stock levels which need action, record receipts and deal with creditors for purchases. Again the Treasury function is following the management accounting requirement.

The process aspect covers the information which management can obtain from records of factory operation, to give reports on machine utilization, supervisory and administrative charges, and all the other information which, with the labour and materials costs, make up the total cost of the product and cover the overall operation of the concern.

These four aspects, the disposal of the product on the one hand and the labour, materials and process on the other, are themselves, when summarized, the "final accounts" of the concern. The difference between them is the profit or loss, their interrelation reflects the general efficiency of the business, and they are so integrated the one with the other that each affects the other. In this way a complete accounting system can be devised to cover every side of the company's activities. This will not be just a cash accounting system, but essentially, and firstly, a management accounting system designed to provide for more efficient control of the concern; management receives essential information earlier than previously, of a more selective nature. When properly designed the system can relieve management by these means of much tedious examination of documents and allow more time for management.

* * *

At the present time there are no EDP installations operating a fully integrated data processing application of this nature, and it is not suggested that one can install such a system quickly. But any application for clerical data processing of any of the "office" procedures should be designed, even if it is initially for one job only, with a view to completing the overall system eventually if the installation is to provide the service to management that will show EDP to be truly economic.

Many concerns, however, are fortunate in that they have available, as an inherent reason for their existence,

some process which is itself susceptible to the application of EDP. For example, a periodical printing house has the added problem of maintaining subscribers' accounts and handling despatch; life assurance offices have their own calculating problems; some engineering concerns have problems of design calculation; transport undertakings handle passenger statistics; and so on. The examples are many. These companies have a far better opportunity of using a computer economically by making part of its time available for the process in which the firm is engaged. It may well be that this is the larger process and that only a small proportion of computer time will be available for commercial data processing. The point of balance between the two is one that can only be established by experience in the particular concern. It will be related also to the type of machine which, if the need, say, for engineering calculation is considerable and the work complex, may well be of a type more suited to scientific than business use.

But I would emphasize again that, for a computer to be economical on straightforward commercial application, then it must do more than the "office" is doing now: it must provide a better service and thereby facilitate more efficient management.

Optimum efficiency of the machine in business applications, however, presupposes that the equipment is ideally suited for the job. But there are still many problems to be solved before the ideal installation can be achieved.

* * *

First of these problems, I would suggest, is the difficulty of preparing the input media fast enough to keep up with the speed of digestion by the computer. At the present time one is, in the majority of applications, faced with the need for creating a department solely engaged in punching and verifying cards, or with training those who record the initial information in the use of mark-sensing techniques. In a few cases some original record has to be made at the point of the transaction (such as in a counter sale) and the media can be simultaneously prepared by automatic tape perforating. Development of character recognition may be the answer, but this is by no means in the immediate future for general application, and I do not think we must overlook the difficulties in feeding the documents after they have served some other purpose and no longer have their pristine newness, unless every document in the office is to be made of stout material. For a very large number of general commercial applications, punched cards would seem to provide the best and most flexible means of feeding new or additional information into a computer system.

At the other end of the system, commercial applications normally require a fairly high proportion of printed output, although much of this would be an off-line operation performed after the computing operation itself. There is always a need to provide customers with documents, in addition to the necessary documentation within the concern. Although one would expect that an EDP installation, properly designed, would of itself tend to reduce the amount of paper passing to management, there remains an irreducible minimum (such as pay slips) which require preparation in a short time at regular intervals. The normal punched card printer has the limitation that one first has to slow down the computer to the speed of punching one card for each subsequent line of print. Character-by-character printing is of necessity slow owing to the limited speed at which paper can be moved both transversely and vertically.

The need is for direct line printing at high speed from a magnetic tape or film on which data for later printing can be assembled during the computing operation. But it is to be hoped that this will not entail interposing between the tape and the printer another miniature computer which serves to lay out the information to suit the design of the particular form being printed, with the necessary facilities for storing different programs of format for different purposes. The one advantage of printing from a punched card is that the separate physical identity of each card and the particular relationship of the information to certain columns and fields determine the printing position both line by line and transversely.

What, then, of the future? Is it going to be possible to achieve a fully integrated data processing system, with the necessary speed and flexibility of input and output, without having, in effect, three computers: one to translate, digest and arrange the input data, one to carry out the computing program on the data, and the third to organize the output for printing? Design and manufacture have so far concentrated on the second of these three functions. Development of the other two is urgently needed before equipment is available to match the concept of truly integrated data processing.

* * *

Pending this development, many current and proposed installations are handicapped by having to carry a large ancillary organization attuned to the speed of the computer. This is not merely a problem of equipment, but also of organization. The more ancillary processes, the more cards that have to be handled, the greater the possibility of error. Recent American experience has proved that a greater proportion of error in an electronic data processing installation as a whole arises in physical manipulation of the cards than in electronic operation of the computer.

So we must not be dismayed if some current installations do not appear on the face of them to be economically successful, nor indeed if they should prove not to work, whatever the cost, as smoothly as it had been

[*Continued on page 170*

BRITISH CONFERENCE ON AUTOMATION AND COMPUTATION

Group B—British Group for Computation and Automatic Control

Early in 1957, a group of engineers and scientists came to the conclusion that electrical and electronic techniques, computers, communication and control theory, and advanced methods of mechanization were developing so rapidly, that integration of these made it possible to effect a major extension of man's control over methods of production. The practical realization of these possibilities, under short titles such as *automation*, made it desirable that an association should be formed to bring together existing professional institutions and management associations, and eventually, it was hoped, research associations, trade associations, trade unions and universities, who were concerned in, or would be significantly affected by these developments. Many organizations and individuals were becoming increasingly concerned in these matters, but were experiencing difficulty in obtaining comprehensive and reliable information. In America, and on the continent of Europe, a number of associations were being formed to provide facilities for exchange of information between interested parties, and it seemed desirable that some association should be formed in the United Kingdom, which would provide a focal point for British interests.

A number of meetings were held between representatives of interested societies and associations and as a result the British Conference on Automation and Computation was formed. It consists of three groups, as follows:—

A The British Group for the Engineering Applications of Automation.
B The British Group for Computation and Automatic Control.
C The British Group for the Sociological and Economic Aspects of Automation Techniques.

Membership of each Group is not open to individuals; the members of the Groups are Institutions, Societies and Associations, who nominate representatives to serve on the Group Committees.

The principal objects of the British Conference are:

(*a*) to provide a channel for the presentation of the British point of view in international discussions;
(*b*) to act domestically in Great Britain as a clearing house between the many existing societies in the automation field, for the exchange of information about papers and meetings and other like purposes.

The objects of Group B are:

(*a*) To foster the development and applications of automatic controls, computing and data processing equipment and programming techniques.
(*b*) To afford a common meeting ground for the adhering organizations whereby such of their activities as fall within the purview of the Group can, if so desired, be co-ordinated and extended.
(*c*) To maintain, as may be desirable, liaison with other Groups of the British Conference on Automation and Computation by direct contact and by representation on the General Committee of the British Conference.
(*d*) To encourage and, if desired, to co-ordinate the presentation at International Conferences of British papers whose subjects fall within the purview of the Group.
(*e*) Through the General Committee of the British Conference on Automation and Computation, to maintain, as may be desirable, liaison with corresponding National Committees of other countries which support such International Conferences.

The following organizations have joined Group B:

British Computer Society
Chartered Institute of Secretaries
Chemical Society
Faculty of Actuaries in Scotland
Institute of Actuaries
Institute of Bankers
Institute of Chartered Accountants in England and Wales
Institute of Chartered Accountants of Scotland
Institute of Cost and Works Accountants
Institute of Fuel
Institute of Municipal Treasurers and Accountants (Incorporated)
Institute of Petroleum
Institute of Physics
Institution of Civil Engineers
Institution of Electrical Engineers
Institution of Mechanical Engineers
Institution of Production Engineers
Iron and Steel Institute
Office Management Association
Royal Aeronautical Society
Royal Institute of Public Administration
Royal Statistical Society
Society of Instrument Technology

The Honorary Officers of Group B are:

Chairman	Mr. T. E. Goldup	Institution of Electrical Engineers
Vice-Chairman	Mr. J. F. Coales	Society of Instrument Technology
Vice-Chairman	Mr. E. M. Renals	Institute of Cost and Works Accountants
Honorary Treasurer	Mr. J. D. Green	Institute of Chartered Accountants in England and Wales
Honorary Secretary	Mr. W. Bamford	Institution of Electrical Engineers

There is an Executive Committee, consisting of representatives of six Organizations, which includes Mr. E. C. Clear Hill representing the British Computer Society. Members of the Society may have seen the Press announcement that was issued by The Institution of Electrical Engineers on behalf of the British Group for Computation and Automatic Control, towards the end of December 1957. The Institution of Electrical Engineers have throughout provided secretarial facilities and accommodation for meetings of the British Conference.

At their first meeting the members of the Group interchanged information as to their forthcoming activities in the field of automation and made arrangements so that the Group, and through it, the British Conference, could act as a clearing house for information on activities of this kind.

Current developments in the international field, falling within the scope of the Group, have been reviewed and a decision was taken to support the International Federation of Automatic Control which was constituted in Paris in September 1957.

E. C. C. H.
H. W. G. G.

CONFERENCES AND COURSES

B.C.S. Symposium on Mechanical Translation

A symposium on the mechanical translation of languages has been arranged for members of the British Computer Society on Thursday 17 April. To be held at Birkbeck College, Malet Street, London, W.C.1, at 2.30 p.m., it will be opened by Dr. A. D. Booth.

He will be followed by Mr. L. Brandwood, giving a short paper on "Some Problems in Translating German". Time will be allowed for general discussion.

After a break for tea, there will be two short papers, the first by Dr. Parker Rhodes and Mr. R. M. Needham on "The Mathematical Treatment of Thesaurus-type Machine Translation," and the second by Mr. R. H. Richens on "Interlingual Machine Translation."

As it may be necessary to limit attendance, members who wish to attend are asked to apply to the Secretary at the Society's office as far in advance as possible.

* * *

Electronic Computer Exhibition

More than thirty manufacturers have already taken space in the Electronic Computer Exhibition opening in the National Hall, Olympia, London, at the end of November, under the patronage of H.R.H. The Duke of Edinburgh.

Plans are also well advanced for the concurrent Business Symposium (1 to 3 December). Some twenty papers will be presented by those using or installing computers for all types of business and commercial application, including a review of computers in Government service and a paper by the nationalized industries.

The exhibition and symposium are being organized jointly by the Radio Communication and Electronic Engineering Association and the Office Appliance and Business Equipment Trades Association. The British Computer Society is represented on the Steering Committee for the Symposium.

* * *

Automation and Management

A three-day residential course is being held at Sundridge Park Management Centre, Bromley, Kent, from 6 to 8 May. Designed for senior executives, the course deals with the impact of computers and automation on management.

Successive sessions will deal with preparation for automation, problems of organization, handling control data, etc., and other matters such as the economic and human problems involved.

Further details may be obtained from the Director of the Centre.

* * *

Computers in Transport Undertakings

Subjects to be discussed at the 33rd Congress of the International Union of Public Transport in Paris (24–30 May) include the use of electronic computers in transport undertakings.

Apart from the usual business applications common to all industries, the transport industry has a number of problems peculiar to itself: analysis of passenger and goods traffic, optimum programming of services, time-table preparation, seat reservation, to name a few.

In this country the British Transport Commission, with one computer operating and several others being installed and on order, have already investigated many of these problems. BOAC and BEA are also active in research into possible uses of computers.

SOCIETY AND COUNCIL NOTES

Membership Forms

All members have now received the new form of application for membership, necessary now that the Society is a company limited by guarantee, incorporating the undertaking required of members of such a company.

Members should ensure, in their own interest, that these forms are completed and returned to the Secretary before 9 April, as otherwise they will not, technically, be Members of the Society and will not be able to exercise their voting rights or attend the Annual General Meeting.

* * *

Nominations for Council

Early in April, each Ordinary Member will receive details of the arrangements for election of the Council for the Society's second year, commencing 1 May. Under the Articles of Association, Council is made up of one representative from each Specialist and Regional Group, with an equal number (but never less than fourteen) of elected members. One-third of the total retire each year by rotation, but are eligible for re-election unless they have served for three consecutive years. This ensures a wide representation of specialist and regional interest, and allows for annual infusion of new blood.

After consultation with representatives of Regional Branches (both formed and forming), Council has agreed to create Regional Groups, each composed of one or more Regional Branches, so that each member is in a Regional Group in which, through his affiliation to a Regional Branch, he has an interest, and therefore voting rights.

Each Regional Group representative on Council will be elected by the members affiliated to the Regional Branches within the Regional Group. This representative, with the chairmen of the Regional Branch Committees (to be elected locally under Branch arrangements), will form the Regional Group Committee, thus having direct contact with both Council and Branches on matters of policy.

Council has also decided that the Specialist Group Committees shall be elected by the members affiliated to each, and that each committee will then appoint a Council Member from among their number, which may be not less than ten nor more than twenty.

Nominations will be called for, therefore, in respect of

(*a*) Regional Group representatives on Council,
(*b*) elected Council Members, and
(*c*) Specialist Group Committee Members.

Nominations may be made by Council, or by any four or more Ordinary Members, accompanied by the consent in writing of the Member nominated, and must reach the Secretary not later than 14 April. Voting papers will be despatched to members on 21 April, for return to the scrutineers not later than 19 May.

* * *

Regional Groups

Regional Groups of the Society will be formed on 1 May to cover the Regional Branches shown below. Precise geographical boundaries are not being laid down at present, so that there is some freedom in determining which Regional Group each future Regional Branch will come under.

Regional Group (from 1 May 1958)	*Regional Branch Formed or Forming*
London	London
Scottish	Glasgow
Northern	Newcastle and District
Yorkshire	Hull, Leeds, Sheffield
North Western	Liverpool, Manchester and District
East Midlands	Nottingham
West Midlands	Birmingham
South Wales and Monmouthshire	Cardiff

* * *

Institutional Members

The rights of Institutional Members have been considered by Council. It has now been decided that each Institutional Member is entitled to nominate two representatives to attend any meeting, or series of meetings, of the Society on the same basis as Ordinary Members, and to receive two copies of all publications.

An Institutional Member has the right, therefore, to vary representation according to the particular interest of each meeting or other activity, so that in any one year quite a large number of people could represent an Institutional Member at different times and take advantage of the Society's activities. Under the Articles of Association they do not, however, have voting rights.

LONDON MEETINGS

The Computer at Norwich

Over 300 Members and guests of the Society were present at the November meeting to hear Mr. A. J. Barnard, City Treasurer of Norwich Corporation, speaking on "The First Year with a Business Computer Installation." Held at the L.C.C. County Hall, with Mr. A. E. Samuels, Chairman of the Council's Establishments Committee, in the chair, many of the senior staff of the Council, as well as representatives of the Institute of Municipal Treasurers and Accountants and of the Office Management Association, were present by invitation of the Society.

Mr. Barnard's paper is being published in *The Computer Journal.*

* * *

Parallel Programming

The December meeting was held at Northampton College of Advanced Technology, when Dr. S. Gill spoke on "Parallel Programming" to over 200 members, with the President of the Society in the Chair.

Dr. Gill began by examining the validity of the common statement that modern digital computers proceed by executing instructions one at a time. After pointing out a number of minor exceptions to this rule, such as output devices which continue to respond to one instruction while the computer is obeying others, he posed, and answered, the question of whether it would ever be worth while having two or more different sequences of instructions being executed simultaneously. In his view this method of programming was bound to come, and would bring definite advantages with it.

The speaker differentiated between two ways of introducing parallel programming. The first, and most obvious, was to provide two or more control units operating together in the same computer, each taking its own sequence of instructions from the store. The second way was to let a single control unit divide its time between two or more different parts of a program. Both these ideas are exemplified in computers now being built in the United States.

The second method is likely to be of greater importance than the first. By allowing several parts of a program (or even different programs) to "time-share" the services of one central control unit, greater economy could be achieved in the use of a variety of slow-acting ancillary devices.

A considerable amount of study would have to be devoted to the establishment of suitable conventions before parallel programming could be accepted for everyday use. New symbols would be needed in flow charts to indicate where operations are intended to proceed in parallel. The instruction code of the computer must enable the programmer to specify how the various branches of a calculation are interrelated. Finally, methods must be worked out of allocating suitable amounts of storage space to the various activities which might be proceeding at the same time, and of avoiding the frightful confusion that might result if things went wrong.

However, some fascinating prospects were forecast if all these problems could be solved: time-sharing might even make it feasible to employ a computer on two quite different programs at once, or file-searching might be done without seriously interrupting or delaying the job on which the machine was working.

Among other consequences, Dr. Gill predicted the disappearance of large buffer stores and elaborate controlling circuits for mechanical devices. Time alone would show whether all this was idle speculation, or whether computers would in fact develop along these lines.

A paper by Dr. Gill on the subject is being published in *The Computer Journal.*

* * *

Principles of Xerography

About 100 members and guests attended a meeting of the Society at Caxton Hall, Westminster, on 20 January. Dr. S. Hughes of Rank Precision Industries spoke on "The Physical Principles of Xerography." Dr. M. V. Wilkes, F.R.S., the President, was in the chair.

The speaker described the phases involved in xerographic printing, and showed how the success of the process depended on the properties of the materials used. The number of questions put by members of the audience at the end of the talk showed that there was a keen interest in the future possibilities of this method of printing.

REGIONAL NEWS

Glasgow

Following its formation last November, the Branch was visited by the President of the Society on 13 January. Later in the month Mr. L. Griffiths, Chief Computing Engineer, Rolls Royce Ltd., gave a lecture on "Experiences of Using a Digital Computer in Industry." A paper on this subject was published in Nos. 1 and 2 of *The Computer Bulletin*.

* * *

Leeds

The inaugural meeting of the Branch was held on 15 January, with Dr. A. S. Douglas, Director of Leeds University Electronic Computing Laboratory, and a Member of Council, in the Chair. Mr. D. W. Hooper, Chairman of Council, was the speaker.

Taking the profession of computing as his subject, he suggested that computing was both an art and a science. Those who followed this new profession could be described as either general practitioners or specialists; this distinction was particularly noticeable in the field of EDP. Mr. Hooper traced the development of computing practice from the construction of early machines to answer a specific need, that of pure calculation.

It followed, he suggested, that the concept and logic of the machines at present available were designed primarily to serve mathematical and scientific purposes. The use of the machines for electronic data processing called for an additional feature—the rapid manipulation of information without a great deal of pure computation.

This was where the general practitioner had to diagnose the system, to decide which operations should be carried out by the computer and which should be ancillary. He would have the services of specialists, in systems design, in media-handling equipment, in computing techniques and in programming.

The difficulty lay in preserving the balance, in not overloading the computer with work which, although perhaps able to be done just as efficiently by alternative methods within the planned system, was put on to the machine just because the machine was there. Mr. Hooper emphasized the part which the Society could play in the ever-widening field of computer application, by bringing together all concerned in this development whatever their specialist interests, to exchange ideas and experience, and to promote mutual understanding of each other's point of view.

Dr. Douglas then reviewed the formation and purpose of the Society, explaining the benefits of membership and indicating the way in which he thought a Leeds Branch might develop local activities. The meeting unanimously endorsed the proposal to form a Branch, subject to Council's approval, and elected the following Committee under the chairmanship of Dr. Douglas: Mr. A. Butterwick (Vice-Chairman), Messrs. F. W. Allum, J. D. Gould, E. Van Ham, B. Hazel, A. King, H. B. LaCosta, P. J. Lown and P. V. Youle, with Mr. E. W. Lunn as Honorary Secretary.

* * *

Manchester

Since the formation of the Branch (reported in the last issue of *The Computer Bulletin*) there has been a series of regular monthly meetings, attended by 50 to 60 members, to hear speakers, including the President of the Society, on a variety of topics.

In January three study groups were formed. One will cover accounting applications of computers, taking as a starting-point the report of the London Computer Group's study group on General Financial Considerations (published in *The Computer Bulletin*, No. 3); the group will try to expand that report to cover other aspects.

Another group is studying programming, particularly automatic coding and its application to data processing. The third group, termed a "Beginners' Study Group," is examining how a feasibility study for a computer application is carried out.

* * *

Newcastle

The first open meeting of the Newcastle and District Branch, on 23 January, was attended by seventy-five people drawn from public authorities, the University and many of the commercial firms in the district.

The chair was taken by Dr. E. S. Page, Director of the University Computer Laboratory, and the meeting was addressed by Mr. D. W. Hooper, Chairman of Council, who took as his subject "Computers and Data Processing" (reproduced elsewhere in this issue).

The Chairman of the meeting, Dr. Page, then gave an outline of the plans for the branch and the arrangements made for future activities. Mr. Hooper then outlined the development of the Society from its inception to the present day, when it was the accepted organization for dealing with matters relating to computers.

In moving a vote of thanks to the speaker for his paper, Mr. Lowden stressed how well the point had been made, that the installation of computers did not relieve management of the need for clear thinking but rather made it more essential than ever.

COMPUTERS AND DATA PROCESSING—
continued from page 164.

hoped. That there will be apparent failures is almost certain. Many of these will be due to this handicap of peripheral machinery, and some, alas! will probably be due to the lack of sufficient preliminary investigation and planning.

This question of the amount of time to be spent in detailed planning of the system before the machine arrives is the last of the problems with which I want to deal specifically. Managements are naturally anxious, once they have decided to order a machine, to see it working as quickly as possible. The diversion of personnel from their normal work, or the employment of additional personnel, to spend many man-weeks in detailed investigation of the job the computer is to do, in designing every form of output to the ultimate detail, in reviewing every source of input for ease in media preparation, and in programming the computer itself to run all the operations required to digest the input information and process it, can be expensive. There is a tendency, therefore, not confined to users but also apparent with some manufacturers, to concentrate on programming the machine, leaving much of the surrounding system to be evolved in practice after installation. If this is done by personnel who have, perhaps, only been trained in programming and have not been systems trained so as to view the system as a whole, much of the work will have to be done again after it has been tried out on the machine.

But if the surrounding system is left to evolve itself, then there is a strong possibility that the computer, however efficient it may be as one piece of machinery in the system, will be limited in its use by the surrounding organization not being equally efficient. Expenditure of several man-weeks of human effort is considerably cheaper than the loss of several computer-weeks of operation.

I do not mean to infer that the majority of current and proposed computer applications for business data processing will not be successful. But where they are designed for one job only, and until the peripheral equipment required is available, the margin for making economies over other methods of providing management information is small. It only needs some possibly unforeseen complication, some lack of detailed investigation and planning, or some other factor, to make all the difference between economic success and failure. Provided we recognize this fact, and provided that we do not condemn, in general terms, the use of computing techniques for business data processing as a result of the failure of a few applications, it should not be very many years before the full benefits of integrated EDP can be gained.

UNIVERSITY COMPUTERS

Durham Inaugurates Ferdinand

FERDINAND (FERranti DIgital Numerical Analyser, Newcastle and Durham), the FERRANTI PEGASUS Computer at the Computing Laboratory of Durham University, started his official life on 21 January, 1958, when Sir George Thomson, F.R.S., Master of Corpus Christi College, Cambridge, opened the laboratory and named the machine. The cost of the machine has been met by a grant from the University Grants Committee and contributions from three firms in the north-east of England.

In his speech, Sir George Thomson said that of all the inventions of our age, none had a wider range of possibilities. The future of the electronic computer seemed to be limited by only one imagination—its own—but he was sure it would soon possess one. "It can be guided by facts not known—or not known in advance—to the man who is running it."

He believed the computer could also help the humanities, notably in the study of literary style. "In painting one can do much by studying brush work to distinguish between artists of the same date and school. There is nothing quite similar in literature. The sort of thing I mean has been done in a very simple way by counting, for example, the number of words of different lengths in various authors.

"The ratio of long and short words is fairly characteristic of an author, but this, of course, is very crude. More subtle and elaborate tests are possible. How often do two adjectives qualify one noun? Are rare nouns usually qualified by a particular adjective? What is the frequency distribution of sentences in length? Is a long sentence normally followed by a short one, or would two short ones be more common? What is the proportion of relative clauses?

"One can think of hundreds of such questions, most of which could be dealt with by a machine. One would take two or three admitted works by an author and see how consistent they are, then one that was in doubt, and so on. This has been seriously suggested to compare Shakespeare and Marlowe. I feel that these machines have something to offer the humanities and that where questions such as authorship are concerned, the methods of science might prove very powerful to the literary mind. Marlowe was a Corpus man, so I obviously have to defend him and say that had he not been killed, he could have written Shakespeare."

The Director of the University's Computing Laboratory, Dr. E. S. Page, said that the computer had been in operation since 25 November, and claimed a 100% accuracy record since that date. One Tyneside firm has already done a considerable amount of work on the machine, and is sufficiently convinced of the potentiality of a computer that it has decided to install its own.

The Durham project is one of the six selected by the University Grants Committee for assistance in purchasing

a computer, the others being Glasgow, Leeds, London, Oxford and Southampton.

Courses have been held since October, in both programming and appreciation, attended by 70 members of the University and 130 specialists from industry and other outside interests. Further courses are planned, as considerable importance is attached to proper examination of the problem and preparation of the data, since the computer costs about £40 an hour to hire.

FERDINAND was demonstrated at the Laboratory's open day, after the opening and naming ceremonies. The machine will be used by University departments, and time will be available for hire by industrial and commercial concerns in the north-east. Further information can be obtained from The Director, University Computing Laboratory, 1 Kensington Terrace, Newcastle upon Tyne 2.

* * *

Oxford Starts Computing Laboratory

The Oxford University Computing Laboratory is now in existence, in the sense that its Director is occupying a room in a house at 9 South Parks Road, and the contractors have just begun the work of transforming the house into a laboratory. Most of the other senior members have been appointed and will soon come into residence.

The laboratory will be equipped with desk calculating machines, some punched-card machines transferred from the Mathematical Institute, a HOLLERITH Electronic Computer (HEC), and a larger, faster, more flexible machine, MERCURY, now being assembled at the Ferranti works in Manchester. HEC is likely to be delivered in May, and MERCURY in August of this year. Most of the large computing problems will be solved using MERCURY, but HEC will be available for smaller calculations, for experiment in numerical techniques, and for training in digital computing. The duties of the laboratory are to provide computing facilities for other University departments (and to some extent for industrial firms and other extra-mural bodies), to teach numerical methods in the University, and to carry out research in numerical methods with particular reference to electronic computers. There will also be opportunities for graduate students, interested in numerical work, to take research degrees in this topic.

Since the staff of the laboratory is relatively small in number, it is intended that authors of problems should write their own programs, with assistance and advice from the staff. This applies to both internal and external users of the machine. Lectures in numerical analysis are already being given, and in Trinity term there will be a general course on techniques in the use of digital computing machines. Towards the end of Trinity term, or possibly early in the summer vacation, there will be a concentrated course, of about ten days, on programming for MERCURY (to be repeated approximately every six months). For those who participate in this course short periods will be allocated, when MERCURY arrives, to enable the user to become familiar with it. Colloquia on computing matters will also be organized from time to time.

Applications for using these facilities should be made to Dr. L. Fox, Director, Oxford University Computing Laboratory, 9 South Parks Road, Oxford.

MEMBERS' DIARY

APRIL 1958

1 CARDIFF—Inaugural Meeting

14 GLASGOW, Royal College of Science and Technology (Montrose Street Extension), 7 p.m.—Annual Meeting, followed by a programme of films on electronic computing

15 LEEDS—"Some Problems of Automatic Data Processing" (D. W. Hooper, Chairman of Council)

17 LONDON, Birkbeck College, Malet Street, W.C.1, 2.30 p.m. Symposium introduced by Dr. A. D. Booth: "Some Problems in Translating German" (L. Brandwood), "The Mathematical Treatment of Thesaurus-type Machine Translation" (Dr. Parker Rhodes and Mr. R. M. Needham), "Interlingual Machine Translation" (R. H. Richens)

21 LONDON, York Hall, Caxton Hall, Westminster, S.W.1, 6.15 p.m.—"The Use of an Electronic Computer in Research Statistics" (Dr. Frank Yates, F.R.S., Rothamsted Experimental Station, and Member of Council)

23 BIRMINGHAM—"Preparing for EDP" (D. W. Hooper, Chairman of Council)

MAY 1958

6 LONDON, Northampton College of Advanced Technology, St. John Street, E.C.1, 2.30 p.m.—"Computer Techniques for the Recording of, and Reference to, Data" (Dr. A. S. Douglas, Leeds University, and Member of Council)
Note change of time from 5.30 p.m. to 2.30 p.m.

19 LONDON, York Hall, Caxton Hall, Westminster, S.W.1, 6.15 p.m.—"Four Years of Automatic Office Work" (T. R. Thompson, Leo Computers Limited)

19 NEWCASTLE—"Applications of a Computer to the Work of Norwich Corporation" (A. J. Barnard, City Treasurer, Norwich).

JUNE 1958

16 LONDON—Annual General Meeting and Presidential Address

BOOK REVIEWS

Installing Electronic Data Processing Systems

By Richard G. Canning, 1957. xiii + 193 pages (New York; John Wiley & Sons Inc. London; Chapman and Hall Limited)—48s. 0d. net.

The author's earlier book, *Electronic Data Processing for Business and Industry* (1956, same publishers, 56s. 0d.), is one of the best books on planning for electronics. The new book deals with the installation phase. It discusses what is involved after the order for the equipment has been placed, the planning of the installation programme, programming the computer, installation, conversion from old routines and the early phases of operation.

It is a book which is directed to a fairly high level of management; it is assumed that the reader is *relatively unacquainted* with electronic computers and mathematics, whilst being familiar with the basic concepts of EDP as discussed in the earlier book. Before he wrote this volume the author had consulted at some length with computer application specialists at Lockheed Aircraft Corporation, Pacific Mutual Life Insurance Company and the Rand Corporation, and had also discussed details with at least 15 other companies. The experience of these corporations, who have approached the installation of computers in different ways, has been summarized here in a model, to preserve some commercial confidentiality, and this model is called the "AAA Manufacturing Company."

It is assumed that this Company, which makes aeroplane sub-assemblies, wishes to improve the management of its production, accounting and sales departments. The organization of the programme of investigation is first discussed, and this leads to a new management structure. In the model reorganization, as so often in real life, the Chief Accountant retains the tabulating department but loses "systems and procedures" to a new "manager of integrated procedures" who now directs the management improvement programme (MIP committee), the EDP installation and the operational research team, supported by advisory committees.

The detailed organization of the EDP programme is then discussed and chapters follow on systems plans, general programming, computer programming, installation, conversion and operation. The chapter on conversion briefly compares the actual experience of some of the Companies consulted: Lockheeds found it easier to convert their factory order data already on punched cards to magnetic tape, than did Pacific Mutual their ordinary life insurance policy records which were previously on plate addressing machines. It is envisaged that the whole programme would take between three and four years. The book concludes with a realistic assessment of the position at the end of the period, when having got the new system beginning to work, management faces the future with three unanswered problems: (1) how will the organization change (will EDP become a super department)? (2) how can EDP help the organization most? and (3) can EDP and factory automation be tied together more?

There are three interesting appendices. The first is a reprint of Wesley Bagby's excellent paper on "The Human Side of Electronics" (AMA 1956). The second is a summary of points to be considered in selection, training and duties of operators, coders, programmers, and systems analysts. The third appendix summarizes the state of the systems plans at the beginning of the second year of transition: this includes a cumulative frequency distribution of record lengths for active shop orders, 70% of which are covered by a record length of 365 characters and 98% by 850; but to cover all records 1,650 characters are needed. Here, in the last few pages of the book, are papers which might well be read first by those who already have their noses on the grindstone.

Mr. Canning has given us a worthy companion to his earlier volume, some stimulating reading for the Board Room on one hand and some wider notions for computer programmers on the other. The bibliography at the end supplements that given in the earlier volume, but once again the author makes no mention whatever of anything which has been written in Britain, which perhaps shows what a long way we ourselves have yet to go.

H. W. G. G.

Mechanical Resolution of Linguistic Problems

By Booth, Cleave, and Brandwood, 1958. (London, Butterworth.)

This book describes work on linguistic problems undertaken at Birkbeck College, London, over the past few years, under the direction of Dr. A. D. Booth. It is concerned principally with the application of a digital computer to translation, but includes also word-frequency counting and concordance making. There is a discussion of general methods of approach, followed by four detailed examples, which are the translation of French, German, and Russian into English, and the preparation of Braille transcriptions. In the earlier sections the authors describe various methods they have developed for efficient programming of the rather intractable operations of mechanical translation, in particular that of searching dictionaries, which will be of interest and use to many workers in all fields where access to a large amount of fixed data is needed.

It would be impossible to summarize such a very detailed work, so I shall mention one or two particular points only.

A well-known problem of mechanical translation is that of words with more than one translation in the output language. The authors decided to assume that all ambiguities would be resolved by specifying the field of the writing—chemistry, mathematics, or whatever. It seems to me that only a rather limited range of subjects can be dealt with like this; in particular, in such subjects as engineering, words in different languages have different fields of application, even in a small subdivision of a subject. For example, in talking about railways the Italian *binario* should be rendered as *platform*, *track* or *line*, according to circumstance. A very

[*Continued on page 174*

BOOK REVIEWS—
continued from page 172

much more elaborate scheme for taking account of context will be needed before this kind of thing can be sorted out. It is only by working on small samples from a very restricted subject that it is possible to appear to avoid these more difficult "multiple meanings"; on p. 286 there is a hint that all may not be well, but it is not developed.

A possible reason why the last point had not forced itself on the authors' notice is the general small scale of practical trials in their (and in all other) mechanical translation work. Though they have probably been "closer to the machine" than any other group, they give no specimens of translations of any length, and it is only by such specimens that it is possible to tell whether the major problems have been solved. Admittedly the problem of testing in this work is very difficult, for while small vocabularies only are used it is easy to test only the passages from which the vocabulary was derived, giving no genuine test; it is better to give no results than to give misleading ones. However, one would have thought that if the time was ripe for a book it should be possible to give conclusive experimental evidence of success. There is, however, no doubt that this book will serve a valuable purpose in publicizing the problems of mechanical translation. It should make it rarer for the mechanical translation worker to meet either of the erroneous attitudes he so often does now, first that the job's trivial, and second that it's impossible.

R. M. N.

New Books

"The Preparation of Programs for an Electronic Digital Computer," 2nd ed., by M. V. Wilkes, D. J. Wheeler and S. Gill. Addison-Wesley Press, Reading, Mass.

(A new edition of the book which first appeared in 1951, based on experience obtained with the EDSAC at the Cambridge University Mathematical Laboratory.)

"Programming for an Automatic Digital Calculator," by K. H. V. Booth. Butterworths, London.

Other Books Noted

"Automation in Business and Industry," by Eugene H. Crabbe. John Wiley, New York and Chapman and Hall, London, 1957.

(A series of lectures given at the University of California from 1955, the first half on general theory and the second on applications.)

"Three Case Studies in Automation," published by Political and Economic Planning, (P.E.P.), London, 1957.

(Three comparisons of "before and after," in a flow production problem of a refinery, in the manufacture of alloy steel seamless tubing, and at LEO.)

"Electronics in the Office," published by the Office Management Association, 1957.

(The collected papers presented at the 1957 Scarborough conference, with an added survey of manufacturers' equipment.)

Integrated and Electronic Data Processing in Canada

A series of articles published during 1957 in *The Canadian Chartered Accountant* have now been brought together into one volume by the Canadian Institute of Chartered Accountants (1957).

Some of these articles have already been noted in our "Books and Articles Noted" column. The full list of these papers is—

What is Integrated Data Processing? (Kenneth M. Place)
Evaluating EDP Possibilities—A Program (John A. Pelthie)
A Review of Integrated Data Processing Equipment (Leo J. Lacey)
Auditing Electronically Produced Records (J. R. Murray)
Integrated Data Processing—A Case History (A. A. Mackey)
The Role of Communications in Integrated Data Processing (T. E. Munford).
The Decision to "Go Electric" (Renny Englebert)

SITUATIONS VACANT

ENGLISH ELECTRIC

require

Qualified Mathematicians and Engineers with Mathematical interests for work in connection with applications of digital computers. This work involves the analytical study of engineering, physical and statistical problems.

Some vacancies exist for liaison work with computer development engineers and for these a knowledge of electronics would be an advantage.

Other vacancies are for applicants interested in the formulation and solution of practical problems arising in the many branches of engineering in which the English Electric Group is engaged.

Applicants will be admitted to the attractive Staff Pension Scheme after the necessary qualifying period and housing assistance will be given to successful candidates. Applications giving full details of qualifications and experience should be sent to C.P.S., Marconi House, 336/7 Strand, London, W.C.2, quoting Ref. CB 313A.

COMMERCIAL APPLICATIONS OF COMPUTERS

The English Electric Company wishes to engage people to work on the commercial application of electronic data processing systems. The work will cover feasibility studies, detailed analysis, system planning and programming of all types of commercial computer application, but particularly:

PRODUCTION CONTROL

COSTING

STATISTICAL ANALYSIS

AND OTHER OPERATIONS OF A LARGE MANUFACTURING COMPANY.

Training will be given in computer techniques to those with sufficient experience in these fields, but candidates should preferably have A.C.W.A. or equivalent qualifications. The work will be based on London or Stafford. Those interested should write, with full details, to Central Personnel Services, Marconi House, 336/7 Strand, London, W.C.2, quoting Ref. CB 589A.

NEWS FROM MANUFACTURERS

The IBM 610

IBM has announced an entirely new type of small electronic calculator—the 610 Auto-Point computer. It is the size of a large desk and consumes about 2 kW.

It has a small drum holding 80 numbers of 31 decimal digits each. Instructions are not put on the drum, but may come from a plugboard (with room for 200 steps) or from a keyboard or a punched tape reader (normally using eight track tape). When instructions are taken from the keyboard they may also be punched on tape, so that the same calculation may be repeated automatically later.

A separate tape reader and punch are provided for data. Numbers may also be inserted via the keyboard, and printed out directly on a typewriter.

Arithmetic may be done in the usual fixed-point manner, or in "auto-point." The latter appears to be similar to the well-known "floating-point" convention, with the difference that instead of storing a separate exponent the decimal point is actually represented in the number, occupying one digit position.

Those who feel more at home in the octal scale will be comforted to know that the 610 will work in this scale just as well as in decimal.

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Xerographic Output Printer

Details have been released of a xerographic output printer developed jointly by Stromberg-Carlson and The Haloid Company in the United States. Known as "Model 5000," the printer employs a Charactron tube to form the optical images. In this tube an electron beam is directed at the appropriate area of a stencil carrying the desired selection of characters. Electrons which pass through the stencil are focused to form an image of the selected character on a phosphorescent screen at the end of the tube. Deflections are applied to correct for the position of the character on the stencil, and to spread the successive characters out along a line.

A speed of over 4,600 lines per minute is claimed for the printer. It prints on a continuous roll, but a paper cutter can be attached if required.

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The Persistor

Machine Design (*December 26, 1957*) reports that a new form of superconductive storage device has been developed by the Ramo-Wooldridge Corporation of Los Angeles. According to this report one of the major difficulties associated with superconductive elements—limited speed—has been overcome. An access time of a fraction of a microsecond is claimed for the new device, called the PERSISTOR.

The device appears to be analogous to a magnetic core. It contains a superconducting ring which retains an electric current whose direction constitutes the information. The ring is made of two metals with different critical fields; this fact presumably assists the selection operation.

New Telephone Exchange Equipment

Modern electronic computer techniques are extensively employed in equipment now operating in the automatic telephone exchange at Lee Green in south-east London, where a new "director" has been installed.

The task of a "director" is to route calls which may have to pass through a series of exchanges to get to their destination. It must therefore contain built-in information about the available routes. Also, since the caller usually dials the whole number before the required exchange can be reached, the director must store this number and repeat it later.

In the new director a magnetic drum is used to store both the routing information and the dialled numbers. Storage space is reserved for up to 114 numbers, and owing to the high speed of the electronic circuits it is quite possible for the equipment to look after 114 calls at once. The total capacity of the drum is approximately 110,000 binary digits, which is comparable with drums used in electronic computers.

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New Computing Centre

The British Tabulating Machine Co. Ltd. has opened a Hollerith Computer Centre at 36 Hertford Street, London, W.1. In addition to the main computer room, with a HEC general purpose machine and ancillary equipment, there is a fully equipped lecture and film theatre, and conference room. Courses will be held for senior management personnel and the rooms will also be available for societies and other organizations to run their own study groups.

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Local Authorities

Some local authorities are installing their own computers, others plan to share or hire them. Following Norwich, the West Riding County Council have taken delivery of a HEC 4; Chester are expected to be next. In the London area, Greenwich has suggested that a number of borough councils should share a machine between them; if this idea does not come to anything, then they plan to hire time for specific jobs.

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Air Bookings

Pan American Airways has invited thirty manufacturers to submit proposals for a new seat reservation machine. It is intended that, in addition to the basic function of making and recording seat reservations, the machine should also provide a variety of statistical information to assist in planning services.

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Brighter Brighton

Brighton Technical College is reported to be installing a computer costing £8,000 for use on advanced technological courses. Nearly a quarter of the cost has been donated by local industrial organizations and firms, the balance being found by the town council.